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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/561,387	03/20/2007	Mikko Maijala	OHMAN-004	6478

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EXAMINER	
MINSKEY, JACOB T	
ART UNIT	PAPER NUMBER
1741	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/561,387	MAIJALA ET AL.	
	Examiner	Art Unit	
	JACOB T. MINSKEY	1741	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 December 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

5)☒ Claim(s) *1,2,5,7-15 and 27-39* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-2, 5, 7-15, and 27-39* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

12)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12/29/2010 has been entered.

Response to Arguments

2. Applicant's arguments filed 12/29/2010 have been fully considered but they are not persuasive.

3. The Examiner acknowledges the cancelation of claims 3-4 and 6 and the amendments to claims 1, 5, 7-8, and 30-33.

4. The main amendment to the independent claim is that the activation of the fibrous material takes place before the precipitation of the additives.

5. Applicant argues that the Klungness reference fails to teach activating the fiber prior to precipitation of the mineral substance. Applicant argues that Klungness teaches mixing the mineral materials and the pulp for 15 minutes and then refining the mixture to facilitate contact with the minerals.

6. The Examiner does not dispute that Klungness teaches such a method, but states that this is only one of a number of methods Klungness refers to. Column 7 lines

16-41 of the reference teach the use of a pressurized apparatus that includes rotating disks. This method is clearly a very similar apparatus as described in the secondary reference of Virtanen.

7. It is the Examiner's stance that there is an explicit teaching of transporting the pulp material through a high pressure vessel prior to precipitation of the mineral material as taught by this alternative embodiment.

8. Applicant further argues that Virtanen does not suggest in situ loading of calcium carbonate fillers, but instead on simply their production.

9. The Examiner admits that there is not a teaching of loading pulp fibers with the filler explicitly taught by Virtanen, but does state that Virtanen does teach the same type of apparatus as discussed in Klungness column 7 lines 16-41. Virtanen focuses on the production of the mineral particles, but does teach that these particles are used to coat other materials. Virtanen further teaches that the materials can be run through the apparatus multiple times to treat the particles with different additives each time (see column 5). Virtanen further teaches that multiple additives and gasses are added at different stages of the apparatus (see column 5).

10. While there is not an explicit teaching of precipitating the minerals directly on the fibers directly after activation, it would have been obvious to an average artisan to combine the teachings of Klungness (especially column 7 lines 16-41) with the teachings of Virtanen to produce the claimed invention. The teachings of Klungness would motivate an average artisan to insert the fiber materials at the start of the Virtanen apparatus to thoroughly mix and activate the fiber material. This paired with

the teachings of adding the precipitation gases at different zones inside the apparatus would lead to an activation zone that occurs prior to precipitation of the mineral substance.

11. It is the combination of teachings that renders the claimed invention obvious. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

12. The remaining arguments are focused on the concepts discussed above and are focused on each reference individually. The Examiner is not persuaded by the arguments.

Claim Rejections - 35 USC § 103

13. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> a. A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

14. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

15. Determining the scope and contents of the prior art.
16. Ascertaining the differences between the prior art and the claims at issue.
17. Resolving the level of ordinary skill in the pertinent art.

18. Considering objective evidence present in the application indicating obviousness or nonobviousness.

19. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

20. Claims 1-2, 5, 7-15, and 27-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Klungness et al, USP 5,223,090 in view of Virtanen, USP 6,416,727, as evidenced by Virtanen WO 96/18454A (already of record).

21. Regarding claims 1, 5, and 30-33, Klungness teaches a method for precipitating mineral particles on fibers to be used in manufacturing paper comprising adding a fiber material in a precipitation reactor, the refiner (column 7 lines 5-12); providing a fiber material comprising fibers to be used as a raw material for the paper pulp, the fibers in the fiber material having a certain capacity for bonding and providing a reactive mineral material (calcium hydroxide, column 1 lines 25-29, column 6 lines 8-17, column 7 lines 7-12); mixing the mineral and fibers (column 6 lines 8-17 and column 7 lines 7-12); calcium hydroxide and fibers are combined to form a suspension (column 6 lines 8-17); carbon dioxide is added to precipitate out the reactive mineral (column 7 lines 16-20); wherein the refiner plates act as a precipitation zone within the reactor (column 7 lines

5-12) and the calcium hydroxide and fibers are combined to form a suspension (column 6 lines 8-17) in order to activate the fibers to enhance fiber bonding (column 7 lines 16-20) for less than a second (column 7 lines 16-41, see discussion above). The fibers with precipitated calcium carbonate are then discharged from the refiner (column 7 lines 35-40 and 47-60).

22. Klungness teaches that a rotating disc apparatus can be utilized (column 7 line 16-41), but is silent on a number of the details on the apparatus itself other than the activation of the fibers can take place at the beginning of the high pressure vessel.

23. Klungness is silent on dispersing the fiber suspension in drops or particles into the precipitation reactor or that there is a gas space created in the refiner.

24. In the same field of endeavor of precipitating calcium based deposits on fibers for papermaking, Virtanen teaches precipitating calcium carbonate in a manner so that the calcium hydroxide is dispersed in a mist (which the Examiner stats reads on the limitation of drops), and then precipitates out in carbon dioxide (see abstract).

25. Virtanen teaches a pin mill mixer which will supply impact and counter impacts as it is the same device as the instant claim (see Figure 3) and an impact mill type flow through mixer, a pin mill mixer. Virtanen further teaches that every other cage can act as a rotor (as shown in Figure 4) or all the cages can act as a rotor (as shown in Figure 3). These cages include grinding pins which the examiner has interpreted as blades (column 5 lines 10-22). The suspension flows through the pin mill mixer/refiner as shown in Figures 3 and 4.

26. Klungness and Virtanen remain as applied above, but are silent on the specifics of the blades and speeds of the blades used in the activation zone.

27. In a teaching reference (previously presented) that is another reference by Virtanen (hereafter referred to as '454), provides that a pin mill (just as the original Virtanen references utilizes a pin mill) should be run at a speed of 20-200 m/s.

28. It would have been obvious to a person of ordinary skill in the art at the time of the invention was made to run the pin mill at the speed disclosed by '454 publication, because both references are provided by the same inventor, leading an average artisan that the teachings are transferable and the more detailed reference will provide a proffered explanation on the settings of the matter.

29. Virtanen further teaches a pin mill with 5 rings (see Figures 3 and 4) that operated in opposite moving directions (see Figure 3) at a speed of 20-200 m/s (see claims) so that carbon dioxide can be fed into the activation zone) at different intermediate stages of the carbonating process (column 4 lines 65-67 column 5 line 1-4) as the pressure and rotation forces the suspension outwards. The mixing of the slurry with the activation of the fibers through the refining and precipitation of the minerals is inherent to the milling process as described in the rejections above and commonly understood by an average artisan in the field of endeavor.

30. It would have been obvious to one of ordinary skill at the time of the invention to combine the teachings of Klungness (especially column 7 lines 16-41) with the teachings of Virtanen to produce the claimed invention. The teachings of Klungness would motivate an average artisan to insert the fiber materials at the start of the

Virtanen apparatus to thoroughly mix and activate the fiber material. This paired with the teachings of adding the precipitation gases at different zones inside the apparatus would lead to an activation zone that occurs prior to precipitation of the mineral substance. . This would provide the benefit of utilizing a process with the known benefit of using only 1/1000 of the energy of the liquid phase dispersion (see Virtanen, column 3 lines 39-50). It would only be a simple substitution of one known method for another that will provide predictable results to use a pin mill refiner system to be capable of both in situ calcium carbonate formation and use with fiber systems.

31. Regarding claims 2 and 29, Virtanen further teaches the use of a 'mist' [abstract], and that that reaction time of the process increases as surface area increases [column 4 lines 4-13]. Smaller volume droplets for the same total mass have a higher surface area. Therefore it would be prima facie obvious to optimize droplet size and thus increase the reaction rate.

32. Additionally, the instant specification that "the small liquid drops, fibers and other solid matter particles disperse into the gas space to form an almost mist-like gas suspension." It would have been obvious that the mist of Virtanen would have read on the size limitations of the instant claims, as the instant application utilizes the same term to describe an acceptable sized object.

33. Regarding claims 7, Virtanen further teaches a pin mill with 5 rings (see Figures 3 and 4) that operated in opposite moving directions (see Figure 3) at a speed of 20-200 m/s (see claims) so that carbon dioxide can be fed into the activation zone) at different

intermediate stages of the carbonating process (column 4 lines 65-67 column 5 line 1-4) or the vessel can be pressurized prior to introduction of the starting material (column 5 line 55) as the pressure and rotation forces the suspension outwards. The mixing of the slurry with the activation of the fibers through the refining and precipitation of the minerals is inherent to the milling process as described in the rejections above and commonly understood by an average artisan in the field of endeavor. The teachings of Klungness and Virtanen both provide teachings that at least some of the mineral substance can be present around the activation so that there is an chance for immediate and thorough mixing of the materials and the minerals.

34. Regarding claims 8 and 34, Virtanen further discloses that he activation zone occurs at the beginning of the reactor is less than one seconds (see abstract).

35. Regarding claims 9-10, 28, and 35-37, Klungness further teaches that the gas utilized is carbon dioxide with a purity of 90% or more which is added as a pressurized gas (column 7 lines 23-24).

36. Regarding claim 11, Klungness and Virtanen remain as applied in claims 1 and 10 above and Virtanen further teaches that the precipitation reactors (the pin mill refiners) can be connected in series (see figures 1a and 1b). The 90% pure gas that is utilized is considered to read on the limitations of this claim. The movement of the pure gas in series from one reactor to the next will implicitly teach that the gas will be less rich in carbon dioxide form the reaction that have already taken place.

37. Regarding claims 12 and 27, Klungness further teaches that calcium hydroxide is added to change the desired opacity of the paper [column 2 lines 7-11].

38. Regarding claim 13, Klungness further teaches chemical and mechanical pulps [column 1 lines 58-60].

39. Regarding claim 14, Klungness further teaches chemical pulps (column 1 lines 58-60). All chemical pulps contain residual mineral impurities such as sodium carbonate and other substances not removed during screening such as excess dirt, and a mechanical pulp contains fiber based fines.

40. Regarding claims 15 and 38-39, Klungness further teaches that the pulp is fed at 5 to 15% consistency which overlaps with the instant claimed range (column 7 lines 5-10).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JACOB T. MINSKEY whose telephone number is (571)270-7003. The examiner can normally be reached on Monday to Friday 7:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Daniels can be reached on 571-272-2450. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JTM

/Matthew J. Daniels/
Supervisory Patent Examiner, Art Unit 1741